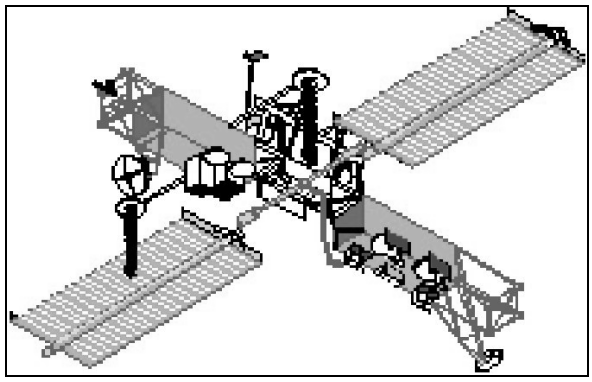
MILSTAR SATELLITE SYSTEM



The Milstar satellite system supports strategic and tactical missions through global communications that are secure, jam resistant, survivable, and have a low probability of intercept. Milstar provides worldwide coverage for multi-Service ground, airborne, submarine, and shipborne terminal communications connectivity. There are the three Milstar segments—space, terminal, and mission control:

- Space Segment: The full Milstar operational capability will be provided by four geosynchronous satellites. The first two satellites possess the original strategic communications low data rate (LDR) payload, while subsequent satellites will also possess a tactical medium data rate (MDR) payload. Each LDR/MDR satellite uses a variety of antennas to support the requirements of both tactical and strategic users. Additionally, cross-links between the satellites provide worldwide connectivity without using vulnerable ground relays.
- Terminal Segment: The Milstar terminal segment consists of a family of multi-Service ground, shipborne, submarine, and airborne terminals functionally interoperable and tailored to meet the individual Service requirements. These terminals include the Air Force air and ground command post terminals, the Navy Extremely High Frequency Satellite Program (NESP) ship, shore, and submarine terminals, and the Army's Single-Channel Anti-jam Man-Portable (SCAMP) terminal and Secure, Mobile, Anti-jam, Reliable, Tactical Terminal (SMART-T).
- Mission Control Segment: The Milstar mission control segment provides communications resource management and satellite operations support. The primary responsibility of the mission control segment is to maintain the satellite in a state of readiness to support user communication requirements during all levels of conflict.

BACKGROUND INFORMATION

The first Milstar satellite was launched in 1994 onboard a Titan IV rocket. The second satellite was launched in 1996. Milstar Flight 3, the first LDR/MDR satellite, was launched on April 30, 1999. However, the mission was declared a failure when a problem with the Centaur upper stage placed the satellite in a nonoperational orbit. Milstar Flight 4 was launched on February 27, 2001 and has undergone on-orbit acceptance testing. In lieu of an additional Milstar satellite to replace Flight 3, the

first flight of the Advanced EHF satellite program (Pathfinder) was to be launched on an accelerated schedule. Restructuring of the AEHF program to reduce technical and funding risk has eliminated the accelerated launch date, but the Pathfinder will be programmed to operate initially as a Milstar II LDR/MDR satellite.

Air Force Space Command declared IOC-1 for Milstar on July 21, 1997. The Milstar LDR system currently supports IOC-1 missions. MOT&E of the first LDR/MDR satellite will begin in FY02 and will support an IOC-2 decision in FY03.

TEST & EVALUATION ACTIVITY

The LDR IOT&E was completed in March 1997. The Milstar IOT&E final Report (August 1998) stated that the Milstar LDR system was effective and suitable with limitations. DOT&E and Air Force Space Command (AFSPC) directed AFOTEC to retest six Measures Of Performance (MOPs). Of these, AFOTEC retested three connectivity MOPs during the period September 1999 to February 2000. AFOTEC also conducted tests from June 2000 to May 2001 to reevaluate two suitability MOPs.

The updated Milstar II (LDR/MDR) TEMP was approved by DOT&E in FY01. The MDR operational tests will focus on individual and combined Service terminals communicating through an in-orbit satellite. Operational testing with the Flight 4 satellite began with DT/OT events during the on-orbit test period and will continue with dedicated OT events that began in late FY01. Anti-jamming and low probability of intercept are two critical capabilities of the Milstar system, and both have undergone on-orbit testing in FY01. MDR uplink anti-jam capabilities were developmentally tested during the Milstar system test. MDR downlink anti-jam and low probability of intercept testing of the NESP MDR terminals was conducted for model validation purposes.

The Milstar system test results from Flight 4 show most of the space segment requirements have been met and the space segment is performing well. One of the primary new capabilities of Flight 4 and the subsequent satellites is anti-jam performance at medium data rates. This is accomplished by a nulling antenna, for which an on-orbit demonstration was planned. This DT/OT event was not conducted, but the operational test community will examine DT data collected during on-orbit testing. The operational test community including DOT&E will determine whether additional testing of nuller end-to-end system performance is required.

TEST & EVALUATION ASSESSMENT

The Milstar Space Segment continues to perform well, as currently fielded with LDR capability. As there has been no operational testing with the on-orbit LDR/MDR satellite, no assessments can be made regarding operational effectiveness and suitability. However, review of the developmental test program for the space segment has not revealed any areas of operational concern.

The loss of Flight 3 (the first LDR/MDR satellite) degrades operational utility. Until the launch of Pathfinder in FY06, worldwide coverage from 65° South to 65° North latitude will not be available for the Milstar MDR terminals. The lack of a fourth medium data rate satellite will limit the ability to provide two-satellite coverage to some contingency operations and therefore limit the throughput of protected communications.

The Milstar Terminal Segment has met with mixed results. The Navy's LDR terminals have been successfully fielded for 4 years. The Air Force airborne terminal has recently demonstrated the required reliability and maintainability. However, the Army ground terminals have demonstrated reliability and maintainability shortfalls. Further discussion of the Navy NESP and Army SCAMP and SMART-T terminals are provided in separate sections of this annual report.

The Mission Control Segment for LDR operations has been performing its mission successfully since the launch of the first Milstar satellite in 1994. During LDR IOT&E, however, testing of a mobile constellation control station's ability to control the constellation revealed an endurance shortfall. DOT&E directed a full retest of the endurance requirement during follow-on testing. AFOTEC plans to conduct the endurance retest in FY02 and has identified their requirements to both USSPACECOM and USSTRATCOM, to determine the most appropriate joint exercise in which to participate.

Additionally, delays in development of the Automated Communications Management System (ACMS) are of concern. Because of the existing shortfalls of ACMS, the Army and other users plan to field their terminals initially with interim planning software (the Milstar Communications Planning Tool – integrated (MCPT-i)), as their primary planning tool. Under this scenario, MCPT-i should be tested to verify it meets all the requirements of the Mission Planning Element.

Finally, in the realm of interoperability, there is currently no concept of operations (CONOPS) for the Joint Task Force (JTF) mission. Test of the JTF mission is critical to evaluate interoperability of the Milstar system and terminals in an operational context. Some interoperability demonstrations have been conducted during developmental testing, and more will be conducted during Navy operational test events. However, until the CONOPS is specified, it is not known if the limited baseband used in these tests is operationally representative. AFOTEC has stated it will not test the JTF networks without a CONOPS; however, to support the IOC-2 decision in June 2003, AFOTEC needs to conduct the JTF operational test by Fall 2002. DOT&E recommends a CONOPS be developed as soon as possible.

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